

SEQUENCE LISTING

<110> Famodu, Layo O.
Orozco, Buddy
Rafalski, Antoni

<120> Plant Aminoacyl-tRNA Synthetase

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<150> 60/092,866

<151> July 15, 1998

<160> 29

<170> Microsoft Office 97

<210> 1

<211> 1948

<212> DNA

<213> Zea mays

<400> 1

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<210> 2
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 <212> PRT
 <213> Zea mays

<400> 2

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Lys Asp Ala Arg Lys Ala Glu Lys Ala Glu Gln Arg Gln Arg Gln Gln
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Gln Gln Gln Gln Gln Pro Ala Asp Ala Glu Asp Pro Phe Ala Ala Asn
  50              55              60

Tyr Gly Glu Val Pro Val Glu Glu Ile Gln Ser Lys Ala Ile Ser Gly
  65              70              75              80

Arg Ser Trp Ser His Val Gly Asp Leu Asp Asp Ser Ala Ala Gly Arg
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Ser Val Leu Ile Arg Gly Ala Ala Gln Ala Ile Arg Pro Val Ser Lys
      100             105             110

Lys Met Ala Phe Val Val Leu Arg Gln Ser Met Ser Thr Val Gln Cys
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Val Leu Val Ala Ser Ala Asp Ala Gly Val Ser Thr Gln Met Val Arg
  130             135             140

Phe Ala Thr Ala Leu Ser Lys Glu Ser Ile Val Asp Val Glu Gly Val
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Val Ser Leu Pro Lys Glu Pro Leu Lys Ala Thr Thr Gln Gln Val Glu
      165             170             175

Ile Gln Val Arg Lys Ile Tyr Cys Ile Asn Arg Ala Ile Pro Thr Leu
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Pro Ile Asn Leu Glu Asp Ala Ala Arg Ser Glu Ala Asp Phe Glu Lys
      195             200             205

Ala Glu Leu Ala Gly Glu Lys Leu Val Arg Val Gly Gln Asp Thr Arg
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Leu Asn Tyr Arg Ala Ile Asp Leu Arg Thr Pro Ser Asn Gln Ala Ile
  225             230             235             240

Phe Arg Ile Gln Cys Gln Val Glu Asn Lys Phe Arg Asp Phe Leu Leu
      245             250             255

Ser Lys Asn Phe Val Gly Ile His Thr Pro Lys Leu Ile Ser Gly Ser
      260             265             270

Ser Glu Gly Gly Ala Ala Val Phe Lys Leu Leu Tyr Asn Gly Gln Pro
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Ala Cys Leu Ala Gln Ser Pro Gln Leu Tyr Lys Gln Met Ala Ile Ser
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Glu Met Glu Ile Lys Glu His Tyr Phe Glu Val Cys Asp Ile Ile Asp
340 345 350

Gly Leu Phe Val Ser Ile Phe Lys His Leu Ser Glu Asn Cys Lys Lys
355 360 365

Glu Leu Glu Ser Ile Asn Arg Gln Tyr Pro Phe Glu Pro Leu Lys Tyr
370 375 380

Leu Asp Lys Thr Phe Lys Leu Thr Tyr Glu Glu Gly Ile Gln Met Leu
385 390 395 400

Lys Glu Ala Gly Thr Glu Ile Glu Pro Met Gly Asp Leu Asn Thr Glu
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Ala Glu Lys Lys Leu Gly Arg Leu Val Arg Glu Lys Tyr Asp Thr Asp
420 425 430

Phe Phe Ile Leu Tyr Arg Tyr Pro Leu Ala Val Arg Pro Phe Tyr Thr
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Met Pro Cys Tyr Asp Asn Pro Ala Tyr Thr Asn Ser Phe Asp Val Phe
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Ile Arg Gly Glu Glu Ile Ile Ser Gly Ala Gln Arg Ile His Thr Pro
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Glu Leu Leu Ala Lys Arg Ala Thr Glu Cys Gly Ile Asp Val Ser Thr
485 490 495

Ile Ser Ala Tyr Ile Glu Ser Phe Ser Tyr Gly Val Pro Pro His Gly
500 505 510

Gly Phe Gly Val Gly Leu Glu Arg Val Val Met Leu Phe Cys Ala Leu
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Asn Asn Ile Arg Lys Thr Ser Leu Phe Pro Arg Asp Pro Gln Arg Leu
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Val Pro
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<212> DNA
<213> Oryza sativa

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ggagaagtat ggaacagaat ttttcacatc ctatcggtat cctttggctg tgcgtccctt 180

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<210> 4
<211> 148
<212> PRT
<213> Oryza sativa

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      20          25          30

Thr Glu Phe Phe Ile Leu Tyr Arg Tyr Pro Leu Ala Val Arg Pro Phe
      35          40          45

Tyr Thr Met Pro Cys Tyr Asp Asn Pro Ala Tyr Ser Asn Ser Phe Asp
      50          55          60

Val Phe Ile Arg Gly Glu Glu Ile Ile Ser Gly Ala Gln Arg Ile His
      65          70          75          80

Leu Pro Glu Leu Leu Thr Lys Arg Ala Thr Glu Cys Gly Ile Asp Ala
      85          90          95

Ser Thr Ile Ser Ser Tyr Ile Glu Ser Phe Ser Tyr Gly Ala Pro Pro
      100          105          110

His Gly Gly Phe Gly Val Gly Leu Glu Arg Val Val Met Leu Phe Cys
      115          120          125

Ala Leu Asn Asn Ile Arg Lys Thr Ser Leu Phe Pro Arg Asp Pro Gln
      130          135          140

Arg Leu Val Pro
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<213> Glycine max

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<210> 6
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<212> PRT
<213> Glycine max

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Leu Ser Arg Glu Ser Ile Val Asp Val Glu Gly Val Val Ser Ile Pro
 35          40          45

Ser Ala Pro Ile Lys Gly Ala Thr Gln Gln Val Glu Ile Gln Val Arg
 50          55          60

Lys Leu Tyr Cys Val Ser Arg Ala Val Pro Thr Leu Pro Ile Asn Leu
 65          70          75          80

Glu Asp Ala Ala Arg Ser Glu Val Glu Ile Glu Thr Ala Leu Gln Ala
 85          90          95

Gly Glu Gln Leu Val Arg Val Asn Gln Asp Thr Arg Leu Asn Phe Arg
100          105          110

Val Leu Asp Val Arg Thr Pro Ala Asn Gln Gly Ile Phe Arg Ile Gln
115          120          125

Ser Gln Val Gly Asn Ala Phe Arg Gln Phe Leu Leu Ser Glu Gly Phe
130          135          140

Cys Glu Ile His Thr Pro Lys Leu Ile Ala Gly Ser Ser Glu Gly Gly
145          150          155          160

Ala Ala Val Phe Arg Leu Asp Tyr Lys Gly Gln Pro Ala Cys Leu Ala
165          170          175

Gln Ser Pro Gln Leu His Lys Gln Met Ser Ile Cys Gly Asp Phe Gly
180          185          190

Arg Val Phe Glu Ile Gly Pro Val Phe Arg Ala Glu Asp Ser Tyr Thr
195          200          205

His Arg His Leu Cys Glu Phe Thr Gly Leu Asp Val Glu Met Glu Ile
210          215          220

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Lys Lys His Tyr Phe Glu Val Met Asp Ile Val Asp Arg Leu Phe Val
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 Val Gly Ser Gln Tyr Pro Phe Glu Pro Leu Lys Tyr Leu Arg Thr Thr
 260 265 270
 Leu Arg Leu Thr Tyr Glu Glu Gly Ile Gln Met Leu Lys Asp Val Gly
 275 280 285
 Val Glu Ile Glu Pro Tyr Gly Asp Leu Asn Thr Glu Ala Glu Arg Lys
 290 295 300
 Leu Gly Gln Leu Val Ser Glu Lys Tyr Gly Thr Glu Phe Tyr Ile Leu
 305 310 315 320
 His Arg Tyr Pro Leu Ala Val Arg Pro Phe Tyr Thr Met Pro Cys Tyr
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<210> 7
 <211> 836
 <212> DNA
 <213> Triticum aestivum

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 <213> Triticum aestivum

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Pro Ala Tyr Leu Ala Gln Ser Leu Gln Ser Tyr Lys Gln Met Ser Ile
35 40 45

Cys Gly Gly Phe Gly Arg Val Phe Glu Ala Gly Pro Val Phe Arg Ser
50 55 60

Glu Lys Ser Asn Thr His Arg His Leu Cys Glu Phe Ile Gly Leu Asp
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Ala Glu Met Glu Ile Lys Glu His Tyr Phe Glu Val Cys Asp Ile Ile
85 90 95

Asp Cys

<210> 9
<211> 2085
<212> DNA
<213> Zea mays

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 <212> PRT
 <213> Zea mays

<400> 10

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Arg	Glu	Glu	Pro	Phe	Gln	Pro	Arg	Val	Glu	Gly	Lys	Val	Gly	Met	Tyr
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Val	Cys	Gly	Val	Thr	Pro	Tyr	Asp	Phe	Ser	His	Ile	Gly	His	Ala	Arg
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		195					200					205			
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210						215					220				
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Asp	Thr	Arg	Lys	Arg	Asn	Pro	Ala	Asp	Phe	Ala	Leu	Trp	Lys	Ala	Ala
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Lys	Glu	Gly	Glu	Pro	Phe	Trp	Asp	Ser	Pro	Trp	Gly	Arg	Gly	Arg	Pro
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Gly	Trp	His	Ile	Glu	Cys	Ser	Ala	Met	Ser	Ala	His	Tyr	Leu	Gly	His
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Val Phe Asp Ile His Gly Gly Gly Lys Asp Leu Ile Phe Pro His His
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 Glu Asn Glu Leu Ala Gln Ser Arg Ala Ala Tyr Pro Asp Ser Glu Val
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 Lys Cys Trp Met His Asn Gly Phe Val Asn Lys Asp Asp Lys Lys Met
 325 330 335
 Ala Lys Ser Asp Asn Asn Phe Phe Thr Ile Arg Asp Ile Ile Ala Leu
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 Tyr His Pro Met Ala Leu Arg Phe Phe Leu Met Arg Thr His Tyr Arg
 355 360 365
 Ser Asp Val Asn His Ser Asp Gln Ala Leu Glu Ile Ala Ser Asp Arg
 370 375 380
 Val Tyr Tyr Ile Tyr Gln Thr Leu Tyr Asp Cys Glu Glu Val Leu Ala
 385 390 395 400
 Thr Tyr Arg Glu Glu Gly Thr Ser Leu Pro Val Pro Ser Glu Glu Gln
 405 410 415
 Asn Leu Ile Gly Lys His His Ser Glu Phe Leu Lys His Met Ser Asn
 420 425 430
 Asp Leu Lys Thr Thr Asp Val Leu Asp Arg Cys Phe Met Glu Leu Leu
 435 440 445
 Lys Ala Ile Asn Ser Ser Leu Asn Asp Leu Lys Lys Leu Gln Gln Lys
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 Ile Glu Gln Gln Lys Lys Lys Gln Gln Gln Gln Lys Lys Gln Gln Gln
 465 470 475 480
 Gln Lys Gln Gln Gln Gln Lys Gln Gln Gln Leu Gln Lys Gln Pro Glu
 485 490 495
 Asp Tyr Ile Gln Ala Leu Ile Ala Leu Glu Thr Glu Leu Lys Asn Lys
 500 505 510
 Leu Ser Ile Leu Gly Leu Met Pro Ser Ser Ser Leu Ala Glu Val Leu
 515 520 525
 Lys Gln Leu Lys Asp Lys Ser Leu Lys Arg Ala Gly Leu Thr Glu Glu
 530 535 540
 Gln Leu Gln Glu Gln Ile Glu Gln Arg Asn Val Ala Arg Lys Asn Lys
 545 550 555 560
 Gln Phe Glu Ile Ser Asp Gly Ile Arg Lys Asn Leu Ala Thr Lys Gly
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 Pro Glu Arg Ser Glu Glu Ser
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<210> 11
 <211> 1957
 <212> DNA
 <213> Oryza sativa

<400> 11
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 <211> 548
 <212> PRT
 <213> Oryza sativa

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 Glu Gly Lys Val Arg Met Tyr Val Cys Gly Val Thr Pro Tyr Asp Phe
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Ser His Ile Gly His Ala Arg Ala Tyr Val Ala Phe Asp Val Leu Tyr
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 Arg Tyr Leu Lys Phe Leu Gly Tyr Glu Val Glu Tyr Val Arg Asn Phe
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 Thr Asp Ile Asp Asp Lys Ile Ile Lys Arg Ala Asn Glu Ala Gly Glu
 100 105 110
 Thr Val Thr Ser Leu Ser Ser Arg Phe Ile Asn Glu Phe Leu Leu Asp
 115 120 125
 Met Ala Gln Leu Gln Cys Leu Pro Pro Thr Cys Glu Pro Arg Val Thr
 130 135 140
 Asp His Ile Glu His Ile Ile Glu Leu Ile Thr Lys Ile Met Glu Asn
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 Gly Lys Ala Tyr Ala Met Glu Gly Asp Val Tyr Phe Ser Val Asp Thr
 165 170 175
 Phe Pro Glu Tyr Leu Ser Leu Ser Gly Arg Lys Leu Asp His Asn Leu
 180 185 190
 Ala Gly Ser Arg Val Ala Val Asp Thr Arg Lys Arg Asn Pro Ala Asp
 195 200 205
 Phe Ala Leu Trp Lys Ala Ala Lys Glu Gly Glu Pro Phe Trp Asp Ser
 210 215 220
 Pro Trp Gly Arg Gly Arg Pro Gly Trp His Ile Glu Cys Ser Ala Met
 225 230 235 240
 Ser Ala His Tyr Leu Gly His Val Phe Asp Ile His Gly Gly Gly Lys
 245 250 255
 Asp Leu Ile Phe Pro His His Glu Asn Glu Leu Ala Gln Ser Arg Ala
 260 265 270
 Ala Tyr Pro Glu Ser Glu Val Lys Cys Trp Met His Asn Gly Phe Val
 275 280 285
 Asn Lys Asp Asp Gln Lys Met Ser Lys Ser Asp Lys Asn Phe Phe Thr
 290 295 300
 Ile Arg Asp Ile Ile Asp Leu Tyr His Pro Met Ala Leu Arg Phe Phe
 305 310 315 320
 Leu Met Arg Thr His Tyr Arg Gly Asp Val Asn His Ser Asp Lys Ala
 325 330 335
 Leu Glu Ile Ala Ser Asp Arg Val Tyr Tyr Ile Tyr Gln Thr Leu Tyr
 340 345 350
 Asp Cys Glu Glu Val Leu Ser Gln Tyr Arg Gly Glu Asn Ile Ser Val
 355 360 365
 Pro Val Pro Val Glu Glu Gln Asp Met Val Asn Lys His His Ser Glu
 370 375 380

Phe Leu Glu Ser Met Ala Asp Asp Leu Arg Thr Thr Asp Val Leu Asp
385 390 395 400

Gly Phe Thr Asp Leu Leu Lys Ala Ile Asn Ser Asn Leu Asn Asp Phe
405 410 415

Lys Lys Leu Gln Gln Lys Leu Glu Gln Gln Lys Lys Lys Gln Gln Gln
420 425 430

Gln Lys Gln Gln Lys Gln Lys Gln Gln Gln Ala Gln Lys Gln Pro Glu
435 440 445

Glu Tyr Ile Gln Ala Met Phe Ala Leu Glu Thr Glu Ile Lys Asn Lys
450 455 460

Ile Ser Ile Leu Gly Leu Met Pro Pro Ser Ser Leu Ala Glu Ala Leu
465 470 475 480

Lys Gln Leu Lys Asp Lys Ala Leu Lys Arg Ala Gly Leu Thr Glu Glu
485 490 495

Leu Leu Gln Glu Gln Ile Glu Gln Arg Thr Ala Ala Arg Lys Asn Lys
500 505 510

Gln Phe Asp Val Ser Asp Gln Ile Arg Lys Gln Leu Gly Ser Lys Gly
515 520 525

Ile Ala Leu Met Asp Glu Pro Thr Gly Thr Val Trp Arg Pro Cys Glu
530 535 540

Pro Glu Ser Glu
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<210> 13
<211> 2183
<212> DNA
<213> Glycine max

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 <211> 574
 <212> PRT
 <213> Glycine max

<400> 14
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 35 40 45
 Arg Ser Lys Asn Phe Ser Phe Cys Ala Thr Ser Ser Pro Pro Leu Thr
 50 55 60
 Ala Glu Lys Gly Cys Gly Lys Ser Asp Ala Glu Cys Pro Thr Leu Pro
 65 70 75 80
 Glu Val Trp Leu His Asn Thr Met Ser Arg Thr Lys Glu Leu Phe Lys
 85 90 95
 Pro Lys Val Glu Ser Lys Val Gly Met Tyr Val Cys Gly Val Thr Ala
 100 105 110
 Tyr Asp Leu Ser His Ile Gly His Ala Arg Val Tyr Val Asn Phe Asp
 115 120 125
 Leu Leu Tyr Arg Tyr Phe Lys His Leu Gly Phe Glu Val Cys Tyr Val
 130 135 140
 Arg Asn Phe Thr Asp Val Asp Asp Lys Ile Ile Ala Arg Ala Lys Glu
 145 150 155 160
 Leu Gly Glu Asp Pro Ile Ser Leu Ser Trp Arg Tyr Cys Glu Glu Phe
 165 170 175
 Cys Gln Asp Met Val Thr Leu Asn Cys Leu Ser Pro Ser Val Glu Pro
 180 185 190

Lys Val Ser Glu His Met Pro Gln Ile Ile Asp Met Ile Glu Lys Ile
 195 200 205
 Leu Asn Asn Gly Tyr Ala Tyr Ile Val Asp Gly Asp Val Tyr Phe Asn
 210 215 220
 Val Glu Lys Phe Pro Glu Tyr Gly Lys Leu Ser Ser Arg Asp Leu Glu
 225 230 235 240
 Asp Asn Arg Ala Gly Glu Arg Val Ala Val Asp Ser Arg Lys Lys Asn
 245 250 255
 Pro Ala Asp Phe Ala Leu Trp Lys Ser Ala Lys Pro Gly Glu Pro Phe
 260 265 270
 Trp Glu Ser Pro Trp Gly Pro Gly Arg Pro Gly Trp His Ile Glu Cys
 275 280 285
 Ser Ala Met Ser Ala Ala Tyr Leu Gly Tyr Ser Phe Asp Ile His Gly
 290 295 300
 Gly Gly Ile Asp Leu Val Phe Pro His His Glu Asn Glu Ile Ala Gln
 305 310 315 320
 Ser Cys Ala Ala Cys Lys Lys Ser Asp Ile Ser Ile Trp Met His Asn
 325 330 335
 Gly Phe Val Thr Ile Asp Ser Val Lys Met Ser Lys Ser Leu Gly Asn
 340 345 350
 Phe Phe Thr Ile Arg Gln Val Ile Asp Val Tyr His Pro Leu Ala Leu
 355 360 365
 Arg Tyr Phe Leu Met Ser Ala His Tyr Arg Ser Pro Ile Asn Tyr Ser
 370 375 380
 Asn Ile Gln Leu Glu Ser Ala Ser Asp Arg Val Phe Tyr Ile Tyr Glu
 385 390 395 400
 Thr Leu His Glu Cys Glu Ser Phe Leu Asn Gln His Asp Gln Arg Lys
 405 410 415
 Asp Ser Thr Pro Pro Asp Thr Leu Asp Ile Ile Asp Lys Phe His Asp
 420 425 430
 Val Phe Leu Thr Ser Met Ser Asp Asp Leu His Thr Pro Val Val Leu
 435 440 445
 Ala Gly Met Ser Asp Pro Leu Lys Ser Ile Asn Asp Leu Leu His Ala
 450 455 460
 Arg Lys Gly Lys Lys Gln Gln Phe Arg Ile Glu Ser Leu Ser Ala Leu
 465 470 475 480
 Glu Lys Ser Val Arg Asp Val Leu Thr Val Leu Gly Leu Met Pro Ala
 485 490 495
 Ser Tyr Ser Glu Val Leu Gln Gln Leu Lys Val Lys Ala Leu Lys Arg
 500 505 510

Ala Asn Phe Thr Glu Glu Glu Val Leu Gln Lys Ile Glu Glu Arg Ala
515 520 525

Thr Ala Arg Met Gln Lys Glu Tyr Ala Lys Ser Asp Ala Ile Arg Lys
530 535 540

Asp Leu Ala Val Leu Gly Ile Thr Leu Met Asp Ser Pro Asn Gly Thr
545 550 555 560

Thr Trp Arg Pro Ala Ile Pro Leu Pro Leu Gln Glu Leu Leu
565 570

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<211> 633
<212> DNA
<213> Zea mays

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<210> 16
<211> 410
<212> PRT
<213> Zea mays

<400> 16
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Arg Gly Gly Val Leu Ala Ser Gly Ile His Pro Leu Arg Arg Leu Asn
35 40 45
Cys Ser Ala Val Glu Ala Val Pro Gly Pro Thr Glu Glu Ala Pro Ala
50 55 60
Pro Gln Ala Arg Lys Lys Arg Val Val Ser Gly Val Gln Pro Thr Gly
65 70 75 80
Ser Val His Leu Gly Asn Tyr Leu Gly Ala Ile Lys Asn Trp Val Ala
85 90 95
Leu Gln Asp Ser Tyr Glu Thr Phe Phe Phe Ile Val Asp Leu His Ala
100 105 110
Ile Thr Leu Pro Tyr Glu Ala Pro Leu Leu Ser Lys Ala Thr Arg Ser
115 120 125

Thr	Ala	Ala	Ile	Tyr	Leu	Ala	Cys	Gly	Val	Asp	Ser	Ser	Lys	Ala	Ser	130	135	140
Ile	Phe	Val	Gln	Ser	His	Val	Arg	Ala	His	Val	Glu	Leu	Met	Trp	Leu	145	150	155
Leu	Ser	Ser	Ser	Thr	Pro	Ile	Gly	Trp	Leu	Asn	Arg	Met	Ile	Gln	Phe	165	170	175
Lys	Glu	Lys	Ser	Arg	Lys	Ala	Gly	Asp	Glu	Asn	Val	Gly	Val	Ala	Leu	180	185	190
Leu	Thr	Tyr	Pro	Val	Leu	Met	Ala	Ser	Asp	Ile	Leu	Leu	Tyr	Gln	Ser	195	200	205
Asp	Leu	Val	Pro	Val	Gly	Glu	Asp	Gln	Thr	Gln	His	Leu	Glu	Leu	Thr	210	215	220
Arg	Glu	Ile	Ala	Glu	Arg	Val	Asn	Asn	Leu	Tyr	Gly	Gly	Arg	Lys	Trp	225	230	235
Lys	Lys	Leu	Gly	Gly	Arg	Gly	Gly	Leu	Leu	Phe	Lys	Val	Pro	Glu	Ala	245	250	255
Leu	Ile	Pro	Pro	Ala	Gly	Ala	Arg	Val	Met	Ser	Leu	Thr	Asp	Gly	Leu	260	265	270
Ser	Lys	Met	Ser	Lys	Ser	Ala	Pro	Ser	Asp	Gln	Ser	Arg	Ile	Asn	Leu	275	280	285
Leu	Asp	Pro	Lys	Asp	Val	Ile	Ala	Asn	Lys	Ile	Lys	Arg	Cys	Lys	Thr	290	295	300
Asp	Ser	Phe	Pro	Gly	Met	Glu	Phe	Asp	Asn	Pro	Glu	Arg	Pro	Glu	Cys	305	310	315
Arg	Asn	Leu	Leu	Ser	Ile	Tyr	Gln	Ile	Ile	Thr	Glu	Lys	Thr	Lys	Glu	325	330	335
Glu	Val	Val	Ser	Glu	Cys	Gln	His	Met	Asn	Trp	Gly	Thr	Phe	Lys	Thr	340	345	350
Thr	Leu	Thr	Glu	Ala	Leu	Ile	Asp	His	Leu	Gln	Pro	Ile	Gln	Val	Arg	355	360	365
Tyr	Glu	Glu	Ile	Met	Ser	Asp	Pro	Ala	Tyr	Leu	Asp	Asn	Val	Leu	Leu	370	375	380
Glu	Gly	Ala	Val	Lys	Ala	Ala	Glu	Ile	Ala	Asp	Ile	Thr	Leu	Asn	Asn	385	390	395
Val	Tyr	Gln	Ala	Met	Gly	Phe	Leu	Arg	Arg							405	410	

<210> 17
 <211> 1536
 <212> DNA
 <213> Glycine max

<400> 17

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<210> 18
 <211> 400
 <212> PRT
 <213> Glycine max

<400> 18

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Pro	Thr	Pro	Thr	Phe	Val	Lys	Lys	Arg	Val	Val	Ser	Gly	Val	Gln	Pro
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65					70					75					80
Val	Ala	Leu	Gln	Asn	Val	Tyr	Asp	Thr	Leu	Phe	Phe	Ile	Val	Asp	Leu
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His	Ala	Ile	Thr	Leu	Pro	Tyr	Asp	Thr	Gln	Gln	Leu	Ser	Lys	Ala	Thr
			100					105					110		
Arg	Ser	Thr	Ala	Ala	Ile	Tyr	Leu	Ala	Cys	Gly	Val	Asp	Pro	Ser	Lys
		115					120					125			
Ala	Ser	Val	Phe	Val	Gln	Ser	His	Val	Arg	Ala	His	Val	Glu	Leu	Met
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 Gln Ser Asp Phe Val Pro Val Gly Glu Asp Gln Lys Gln His Leu Glu
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 Lys Trp Lys Lys Leu Gly Gly Tyr Asp Ser Arg Gly Gly Thr Ile Phe
 225 230 235 240
 Lys Val Pro Glu Pro Leu Ile Pro Pro Ala Gly Ala Arg Ile Met Ser
 245 250 255
 Leu Thr Asp Gly Leu Ser Lys Met Ser Lys Ser Ala Pro Ser Asp Gln
 260 265 270
 Ser Arg Ile Asn Ile Leu Asp Pro Lys Asp Leu Ile Ala Asn Lys Ile
 275 280 285
 Lys Arg Cys Lys Thr Asp Ser Phe Pro Gly Leu Glu Phe Asp Asn Ser
 290 295 300
 Glu Arg Pro Glu Cys Asn Asn Leu Val Ser Ile Tyr Gln Leu Ile Ser
 305 310 315 320
 Gly Lys Thr Lys Glu Glu Val Val Gln Glu Cys Gln Asn Met Asn Trp
 325 330 335
 Gly Thr Phe Lys Pro Leu Leu Thr Asp Ala Leu Ile Asp His Leu His
 340 345 350
 Pro Ile Gln Val Arg Tyr Glu Glu Ile Met Ser Asp Ser Gly Tyr Leu
 355 360 365
 Asp Gly Val Leu Ala Gln Gly Ala Arg Asn Ala Ala Asp Ile Ala Asp
 370 375 380
 Ser Thr Leu Asn Asn Ile Tyr Gln Ala Met Gly Phe Phe Lys Arg Gln
 385 390 395 400

<210> 19
 <211> 725
 <212> DNA
 <213> Triticum aestivum

<400> 19
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 ccagcagggg cccgtgtgat gtccttaact gatggcctct ccaagatgtc gaagtctgct 120
 ccttcagatt tgtctcgcat taaccttctt gacccaaatg atgtgattgt gaacaaaatc 180
 aaacgctgca aaactgactc gctccctggc ttggaattcg acaacccaga gaggccggaa 240
 tgcaaaaaatc ttctctcagt ctaccagatc atcactggaa aaacgaaaga ggaagtgtgt 300

agtgaatgcc aagatatgaa ctggggggacg ttcaagggtta cccttacgga tgccttaatt 360
 gatcatctgc aacctattca ggttcgatac gaggagatca tgtctgatcc aggttatttg 420
 gacaatgttc tgctaaatgg ggcagggaaa gcttctgaga tagcagacgc caccctcaac 480
 aacgtctacc aagccatggg tttcttgccg agatagcata tgtagaacat tttttataac 540
 tgcacaatgc tagttttgca cttgttggcc tttctgctag tgggtactgat aagcgttttg 600
 tttgatatgc ttggattagc cttttgttcc tgggtattat ggacactggt aataggtatt 660
 aaaaggatta tttactgaaa aaaaaaaaaa aaaaaaaaaa attaaaaggg ggcgcgcgta 720
 ccata 725

<210> 20
 <211> 171
 <212> PRT
 <213> Triticum aestivum

<400> 20
 Leu Val Pro Asn Ser Ala Arg Gly Gly Ser Leu Phe Lys Val Pro Glu
 1 5 10 15
 Ala Leu Ile Pro Pro Ala Gly Ala Arg Val Met Ser Leu Thr Asp Gly
 20 25 30
 Leu Ser Lys Met Ser Lys Ser Ala Pro Ser Asp Leu Ser Arg Ile Asn
 35 40 45
 Leu Leu Asp Pro Asn Asp Val Ile Val Asn Lys Ile Lys Arg Cys Lys
 50 55 60
 Thr Asp Ser Leu Pro Gly Leu Glu Phe Asp Asn Pro Glu Arg Pro Glu
 65 70 75 80
 Cys Lys Asn Leu Leu Ser Val Tyr Gln Ile Ile Thr Gly Lys Thr Lys
 85 90 95
 Glu Glu Val Val Ser Glu Cys Gln Asp Met Asn Trp Gly Thr Phe Lys
 100 105 110
 Val Thr Leu Thr Asp Ala Leu Ile Asp His Leu Gln Pro Ile Gln Val
 115 120 125
 Arg Tyr Glu Glu Ile Met Ser Asp Pro Gly Tyr Leu Asp Asn Val Leu
 130 135 140
 Leu Asn Gly Ala Gly Lys Ala Ser Glu Ile Ala Asp Ala Thr Leu Asn
 145 150 155 160
 Asn Val Tyr Gln Ala Met Gly Phe Leu Arg Arg
 165 170

<210> 21
 <211> 1062
 <212> DNA
 <213> Zea mays

<400> 21
 gcacgagga catcacgtg ctggatttcc tgagagaggt gggccgtttt gcacgcgtgg 60
 gtacaatgat cgccaaggag agcgtcaaga agcgtcttgc gtcggaagac gggatgagct 120
 acaccgagt tacctaccag ctgctgcagg gctacgactt cctttacatg ttcaagaata 180
 tgggtgtcaa tgtgcagatc gggggcagcg atcagtgggg gaacatcaca gcgggaactg 240
 agttgatcag aaaaatcttg caggttgaag gggcgcatgg actcacattc ccacttctgc 300
 tgaagagcga cggtaccaa tttggaaaga cggaggatgg ggcaatctgg ctctcttcga 360

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agatgctttc tccttacaag ttctatcagt acttctttgc ggtgccagac atcgatgtca 420
tcaggtttat gaagatcctg acgttcctga gcttggatga gattctggag ctagaagact 480
cgatgaagaa gcctggctat gtgccaaaca ctgttcagaa gaggcttgca gaagaggtga 540
cgcgatttgt tcatggcgag gagggattgg aggaggcatt gaaggcaacc gaggccttga 600
gaacctggtgc tcagacacaa ttggatgcac aaacaattga ggggatagca gatgatgtgc 660
cttcatgctc tttagcttat gatcaagtgt tcaagtctcc acttattgat ttggctgttt 720
ccacagggtt gctcactagt aagtcagcag ttaagcggct tattaagcaa ggtggtctgt 780
acttgaataa cgtgaggatt gatagtggag ataagctggt tgaggaaggt gatatagttg 840
atgggaaggt gctcttgttg tctgctggaa agaagaacaa gatggttgtg aggatatctt 900
gactactctt atttgttctt tataacttat tttagccatt gaggagaaaa gtaacggtgt 960
tgtgtcttca aaactcaaat gagctgtcta tgagcataca gattgttata ttggagaggt 1020
tgaacacacc tttttttttg ctctaaaaaa aaaaaaaaaa aa 1062

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<210> 22
<211> 299
<212> PRT
<213> Zea mays

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<400> 22
Thr Arg Asp Ile Thr Leu Leu Asp Phe Leu Arg Glu Val Gly Arg Phe
 1          5          10          15

Ala Arg Val Gly Thr Met Ile Ala Lys Glu Ser Val Lys Lys Arg Leu
 20          25          30

Ala Ser Glu Asp Gly Met Ser Tyr Thr Glu Phe Thr Tyr Gln Leu Leu
 35          40          45

Gln Gly Tyr Asp Phe Leu Tyr Met Phe Lys Asn Met Gly Val Asn Val
 50          55          60

Gln Ile Gly Gly Ser Asp Gln Trp Gly Asn Ile Thr Ala Gly Thr Glu
 65          70          75          80

Leu Ile Arg Lys Ile Leu Gln Val Glu Gly Ala His Gly Leu Thr Phe
 85          90          95

Pro Leu Leu Leu Lys Ser Asp Gly Thr Lys Phe Gly Lys Thr Glu Asp
100          105          110

Gly Ala Ile Trp Leu Ser Ser Lys Met Leu Ser Pro Tyr Lys Phe Tyr
115          120          125

Gln Tyr Phe Phe Ala Val Pro Asp Ile Asp Val Ile Arg Phe Met Lys
130          135          140

Ile Leu Thr Phe Leu Ser Leu Asp Glu Ile Leu Glu Leu Glu Asp Ser
145          150          155          160

Met Lys Lys Pro Gly Tyr Val Pro Asn Thr Val Gln Lys Arg Leu Ala
165          170          175

Glu Glu Val Thr Arg Phe Val His Gly Glu Glu Gly Leu Glu Glu Ala
180          185          190

Leu Lys Ala Thr Glu Ala Leu Arg Pro Gly Ala Gln Thr Gln Leu Asp
195          200          205

Ala Gln Thr Ile Glu Gly Ile Ala Asp Asp Val Pro Ser Cys Ser Leu
210          215          220

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Ala Tyr Asp Gln Val Phe Lys Ser Pro Leu Ile Asp Leu Ala Val Ser
225 230 235 240

Thr Gly Leu Leu Thr Ser Lys Ser Ala Val Lys Arg Leu Ile Lys Gln
245 250 255

Gly Gly Leu Tyr Leu Asn Asn Val Arg Ile Asp Ser Glu Asp Lys Leu
260 265 270

Val Glu Glu Gly Asp Ile Val Asp Gly Lys Val Leu Leu Leu Ser Ala
275 280 285

Gly Lys Lys Asn Lys Met Val Val Arg Ile Ser
290 295

<210> 23

<211> 346

<212> PRT

<213> Drosophila melanogaster

<400> 23

Met Val Asp Lys Val Ala Asn Gly Val Ser Lys Lys Gly Ala Lys Lys
1 5 10 15

Ala Lys Ala Ala Lys Lys Ala Lys Ala Asn Ala Ser Thr Ala Ala Ala
20 25 30

Asn Asn Ser Gly Gly Asp Ser Ala Asp His Ala Ala Gly Arg Tyr Gly
35 40 45

Ser Met Ser Lys Asp Lys Arg Ser Arg Asn Val Val Ser Ser Gly Val
50 55 60

Gly Lys Gly Val Trp Val Arg Gly Arg Val His Thr Ser Arg Ala Lys
65 70 75 80

Gly Lys Cys Arg Ser Ser Thr Val Cys Ala Val Gly Asp Val Ser Lys
85 90 95

Met Val Lys Ala Gly Asn Lys Ser Asp Ala Lys Val Ala Val Ser Ser
100 105 110

Lys Ser Cys Thr Ser Ser Val Val Ser Ala Lys Ala Asp Ala Ser Arg
115 120 125

Asn Ala Asp Asp Ala Gly Asn Arg Val Asn Asp Thr Arg Asp Asn Arg
130 135 140

Val Asp Arg Thr Ala Asn Ala Arg Ala Gly Val Cys Arg Arg Asp Thr
145 150 155 160

Gly Thr His Thr Lys Ser Ala Ala Ser Gly Gly Ala Asn Val Thr Val
165 170 175

Ser Tyr Lys Asp Ser Ala Tyr Ala Ser Tyr Lys Met Ala Ala Ala Asp
180 185 190

Asp Lys Val Tyr Thr Val Gly Ala Val Arg Ala Asp Ser Asn Thr His
195 200 205

Arg His Thr Val Gly Asp Met Ala Lys Tyr His Tyr His Val His Thr
 210 215 220
 Gly Asn Thr Thr Ser Lys Gly Arg Asp Lys Tyr Ala Lys Ser Val Gly
 225 230 235 240
 Tyr Lys Val Asp Ala Lys Ala Asp Gly Val Ala Met Arg Ala Gly Val
 245 250 255
 Thr Gly Asp Asp Ser Thr Asn Lys Gly Arg Val Lys Ala Lys Tyr Asp
 260 265 270
 Thr Asp Tyr Asp Lys Ala Arg Tyr Thr Met Asp Asn Asn Val Tyr Ser
 275 280 285
 Asn Ser Tyr Asp Met Met Arg Gly Ser Gly Ala Arg His Asp Tyr Arg
 290 295 300
 Ala Lys His His Gly Asp Thr Ser Lys Ala Ala Tyr Ser Arg Tyr Gly
 305 310 315 320
 Cys His Ala Gly Gly Gly Gly Met Arg Val Val Met Tyr Gly Asp Asn
 325 330 335
 Arg Lys Thr Ser Met Arg Asp Lys Arg Thr
 340 345

<210> 24
 <211> 501
 <212> PRT
 <213> Rattus norvegicus

<400> 24
 Met Pro Ser Ala Asn Ala Ser Arg Lys Gly Gln Glu Lys Pro Arg Glu
 1 5 10 15
 Ile Val Asp Ala Ala Glu Asp Tyr Ala Lys Glu Arg Tyr Gly Val Ser
 20 25 30
 Ser Met Ile Gln Ser Gln Glu Lys Pro Asp Arg Val Leu Val Arg Val
 35 40 45
 Lys Asp Leu Thr Val Gln Lys Ala Asp Glu Val Val Trp Val Arg Ala
 50 55 60
 Arg Val His Thr Ser Arg Ala Lys Gly Lys Gln Cys Phe Leu Val Leu
 65 70 75 80
 Arg Gln Gln Gln Phe Asn Val Gln Ala Leu Val Ala Val Gly Asp His
 85 90 95
 Ala Ser Lys Gln Met Val Lys Phe Ala Ala Asn Ile Asn Lys Glu Ser
 100 105 110
 Ile Ile Asp Val Glu Gly Ile Val Arg Lys Val Asn Gln Lys Ile Gly
 115 120 125
 Ser Cys Thr Gln Gln Asp Val Glu Leu His Val Gln Lys Ile Tyr Val
 130 135 140

Ile	Ser	Leu	Ala	Glu	Pro	Arg	Leu	Pro	Leu	Gln	Leu	Asp	Asp	Ala	Ile	
145					150					155					160	
Arg	Pro	Glu	Val	Glu	Gly	Glu	Glu	Asp	Gly	Arg	Ala	Thr	Val	Asn	Gln	
				165					170					175		
Asp	Thr	Arg	Leu	Asp	Asn	Arg	Ile	Ile	Asp	Leu	Arg	Thr	Ser	Thr	Ser	
			180					185					190			
Gln	Ala	Ile	Phe	His	Leu	Gln	Ser	Gly	Ile	Cys	His	Leu	Phe	Arg	Glu	
		195					200					205				
Thr	Leu	Ile	Asn	Lys	Gly	Phe	Val	Glu	Ile	Gln	Thr	Pro	Lys	Ile	Ile	
	210					215					220					
Ser	Ala	Ala	Ser	Glu	Gly	Gly	Ala	Asn	Val	Phe	Thr	Val	Ser	Tyr	Phe	
225					230					235					240	
Lys	Ser	Asn	Ala	Tyr	Leu	Ala	Gln	Ser	Pro	Gln	Leu	Tyr	Lys	Gln	Met	
				245					250					255		
Cys	Ile	Cys	Ala	Asp	Phe	Glu	Lys	Val	Phe	Cys	Ile	Gly	Pro	Val	Phe	
			260					265					270			
Arg	Ala	Glu	Asp	Ser	Asn	Thr	His	Arg	His	Leu	Thr	Glu	Phe	Val	Gly	
		275					280					285				
Leu	Asp	Ile	Glu	Met	Ala	Phe	Asn	Tyr	His	Tyr	His	Glu	Val	Val	Glu	
	290					295					300					
Glu	Ile	Ala	Asp	Thr	Leu	Val	Gln	Ile	Phe	Lys	Gly	Leu	Gln	Glu	Arg	
305					310					315					320	
Phe	Gln	Thr	Glu	Ile	Gln	Thr	Val	Asn	Lys	Gln	Phe	Pro	Cys	Glu	Pro	
				325					330					335		
Phe	Lys	Phe	Leu	Glu	Pro	Thr	Leu	Arg	Leu	Glu	Tyr	Cys	Glu	Ala	Leu	
			340					345					350			
Ala	Met	Leu	Arg	Glu	Ala	Gly	Val	Glu	Met	Asp	Asp	Glu	Glu	Asp	Leu	
		355					360					365				
Ser	Thr	Pro	Asn	Glu	Lys	Leu	Leu	Gly	Arg	Leu	Val	Lys	Glu	Lys	Tyr	
	370					375					380					
Asp	Thr	Asp	Phe	Tyr	Val	Leu	Asp	Lys	Tyr	Pro	Leu	Ala	Val	Arg	Pro	
385					390					395					400	
Phe	Tyr	Thr	Met	Pro	Asp	Pro	Arg	Asn	Pro	Lys	Gln	Ser	Asn	Ser	Tyr	
			405						410					415		
Asp	Met	Phe	Met	Arg	Gly	Glu	Glu	Ile	Leu	Ser	Gly	Ala	Gln	Arg	Ile	
			420					425					430			
His	Asp	Pro	Gln	Leu	Leu	Thr	Glu	Arg	Ala	Leu	His	His	Gly	Ile	Asp	
		435					440					445				
Leu	Glu	Lys	Ile	Lys	Ala	Tyr	Ile	Asp	Ser	Phe	Arg	Phe	Gly	Ala	Pro	
	450					455					460					

Pro His Ala Gly Gly Gly Ile Gly Leu Glu Arg Val Thr Met Leu Phe
465 470 475 480

Leu Gly Leu His Asn Val Arg Gln Thr Ser Met Phe Pro Arg Asp Pro
485 490 495

Lys Arg Leu Thr Pro
500

<210> 25
<211> 500
<212> PRT
<213> Homo sapiens

<400> 25
Met Pro Ser Ala Thr Gln Arg Lys Ser Gln Glu Lys Pro Arg Glu Ile
1 5 10 15

Met Asp Ala Ala Glu Asp Tyr Ala Lys Glu Arg Tyr Gly Ile Ser Ser
20 25 30

Met Ile Gln Ser Gln Glu Lys Pro Asp Arg Val Leu Val Arg Val Arg
35 40 45

Asp Leu Thr Ile Gln Lys Ala Asp Glu Val Val Trp Val Arg Ala Arg
50 55 60

Val His Thr Ser Arg Ala Lys Gly Lys Gln Cys Phe Leu Val Leu Arg
65 70 75 80

Gln Gln Gln Phe Asn Val Gln Ala Leu Val Ala Val Gly Asp His Ala
85 90 95

Ser Lys Gln Met Val Lys Phe Ala Ala Asn Ile Asn Lys Glu Ser Ile
100 105 110

Val Asp Val Glu Gly Val Val Arg Lys Val Asn Gln Lys Ile Gly Ser
115 120 125

Cys Thr Gln Gln Asp Val Glu Leu His Val Gln Lys Ile Tyr Val Ile
130 135 140

Ser Leu Ala Glu Pro Arg Leu Pro Leu Gln Leu Asp Asp Ala Val Arg
145 150 155 160

Pro Glu Gln Glu Gly Glu Glu Glu Gly Arg Ala Thr Val Asn Gln Asp
165 170 175

Thr Arg Leu Asp Asn Arg Val Ile Asp Leu Arg Thr Ser Thr Ser Gln
180 185 190

Ala Val Phe Arg Leu Gln Ser Gly Ile Cys His Leu Phe Arg Glu Thr
195 200 205

Leu Ile Asn Lys Gly Phe Val Glu Ile Gln Thr Pro Lys Ile Ile Ser
210 215 220

Ala Ala Ser Glu Gly Gly Ala Asn Val Phe Thr Val Ser Tyr Phe Lys
225 230 235 240

Asn Asn Ala Tyr Leu Ala Gln Ser Pro Gln Leu Tyr Lys Gln Met Cys
 245 255
 Ile Cys Ala Asp Phe Glu Lys Val Phe Ser Ile Gly Pro Val Phe Arg
 260 265 270
 Ala Glu Asp Ser Asn Thr His Arg His Leu Thr Glu Phe Val Gly Leu
 275 280 285
 Asp Ile Glu Met Ala Phe Asn Tyr His Tyr His Glu Val Met Glu Glu
 290 295 300
 Ile Ala Asp Thr Met Val Gln Ile Phe Lys Gly Leu Gln Glu Arg Phe
 305 310 315 320
 Gln Thr Glu Ile Gln Thr Val Asn Lys Gln Phe Pro Cys Glu Pro Phe
 325 330 335
 Lys Phe Leu Glu Pro Thr Leu Arg Leu Glu Tyr Cys Glu Ala Leu Ala
 340 345 350
 Met Leu Arg Glu Ala Gly Val Glu Met Gly Asp Glu Asp Asp Leu Ser
 355 360 365
 Thr Pro Asn Glu Lys Leu Leu Gly His Leu Val Lys Glu Lys Tyr Asp
 370 375 380
 Thr Asp Phe Tyr Ile Leu Asp Lys Tyr Pro Leu Ala Val Arg Pro Phe
 385 390 395 400
 Tyr Thr Met Pro Asp Pro Arg Asn Pro Lys Gln Ser Lys Ser Tyr Asp
 405 410 415
 Met Phe Met Arg Gly Glu Glu Ile Leu Ser Gly Ala Gln Arg Ile His
 420 425 430
 Asp Pro Gln Leu Leu Thr Glu Arg Ala Leu His His Gly Asn Asp Leu
 435 440 445
 Glu Lys Ile Lys Ala Tyr Ile Asp Ser Phe Arg Phe Gly Ala Pro Pro
 450 455 460
 His Ala Gly Gly Gly Ile Gly Leu Glu Arg Val Thr Met Leu Phe Leu
 465 470 475 480
 Gly Leu His Asn Val Arg Gln Thr Ser Met Phe Pro Arg Asp Pro Lys
 485 490 495
 Arg Leu Thr Pro
 500

<210> 26
 <211> 459
 <212> PRT
 <213> Haemophilus influenzae Rd

<400> 26
 Met Leu Lys Ile Phe Asn Thr Leu Thr Arg Glu Lys Glu Ile Phe Lys
 1 5 10 15

Pro Ile His Glu Asn Lys Val Gly Met Tyr Val Cys Gly Val Thr Val
 20 25 30
 Tyr Asp Leu Cys His Ile Gly His Gly Arg Thr Phe Val Cys Phe Asp
 35 40 45
 Val Ile Ala Arg Tyr Leu Arg Ser Leu Gly Tyr Asp Leu Thr Tyr Val
 50 55 60
 Arg Asn Ile Thr Asp Val Asp Asp Lys Ile Ile Lys Arg Ala Leu Glu
 65 70 75 80
 Asn Lys Glu Thr Cys Asp Gln Leu Val Asp Arg Met Val Gln Glu Met
 85 90 95
 Tyr Lys Asp Phe Asp Ala Leu Asn Val Leu Arg Pro Asp Phe Glu Pro
 100 105 110
 Arg Ala Thr His His Ile Pro Glu Ile Ile Glu Ile Val Glu Lys Leu
 115 120 125
 Ile Lys Arg Gly His Ala Tyr Val Ala Asp Asn Gly Asp Val Met Phe
 130 135 140
 Asp Val Glu Ser Phe Lys Glu Tyr Gly Lys Leu Ser Arg Gln Asp Leu
 145 150 155 160
 Glu Gln Leu Gln Ala Gly Ala Arg Ile Glu Ile Asn Glu Ile Lys Lys
 165 170 175
 Asn Pro Met Asp Phe Val Leu Trp Lys Met Ser Lys Glu Asn Glu Pro
 180 185 190
 Ser Trp Ala Ser Pro Trp Gly Ala Gly Arg Pro Gly Trp His Ile Glu
 195 200 205
 Cys Ser Ala Met Asn Cys Lys Gln Leu Gly Glu Tyr Phe Asp Ile His
 210 215 220
 Gly Gly Gly Ser Asp Leu Met Phe Pro His His Glu Asn Glu Ile Ala
 225 230 235 240
 Gln Ser Cys Cys Ala His Gly Gly Gln Tyr Val Asn Tyr Trp Ile His
 245 250 255
 Ser Gly Met Ile Met Val Asp Lys Glu Lys Met Ser Lys Ser Leu Gly
 260 265 270
 Asn Phe Phe Thr Ile Arg Asp Val Leu Asn His Tyr Asn Ala Glu Ala
 275 280 285
 Val Arg Tyr Phe Leu Leu Thr Ala His Tyr Arg Ser Gln Leu Asn Tyr
 290 295 300
 Ser Glu Glu Asn Leu Asn Leu Ala Gln Gly Ala Leu Glu Arg Leu Tyr
 305 310 315 320
 Thr Ala Leu Arg Gly Thr Asp Gln Ser Ala Val Ala Phe Gly Gly Glu
 325 330 335

Asn Phe Val Ala Thr Phe Arg Glu Ala Met Asp Asp Asp Phe Asn Thr
 340 345 350

Pro Asn Ala Leu Ser Val Leu Phe Glu Met Ala Arg Glu Ile Asn Lys
 355 360 365

Leu Lys Thr Glu Asp Val Glu Lys Ala Asn Gly Leu Ala Ala Arg Leu
 370 375 380

Arg Glu Leu Gly Ala Ile Leu Gly Leu Leu Gln Gln Glu Pro Glu Lys
 385 390 395 400

Phe Leu Gln Ala Gly Ser Asn Asp Asp Glu Val Ala Lys Ile Glu Ala
 405 410 415

Leu Ile Lys Gln Arg Asn Glu Ala Arg Thr Ala Lys Asp Trp Ser Ala
 420 425 430

Ala Asp Ser Ala Arg Asn Glu Leu Thr Ala Met Gly Ile Val Leu Glu
 435 440 445

Asp Gly Pro Asn Gly Thr Thr Trp Arg Lys Gln
 450 455

<210> 27

<211> 461

<212> PRT

<213> Escherichia coli

<400> 27

Met Leu Lys Ile Phe Asn Thr Leu Thr Arg Gln Lys Glu Glu Phe Lys
 1 5 10 15

Pro Ile His Ala Gly Glu Val Gly Met Tyr Val Cys Gly Ile Thr Val
 20 25 30

Tyr Asp Leu Cys His Ile Gly His Gly Arg Thr Phe Val Ala Phe Asp
 35 40 45

Val Val Ala Arg Tyr Leu Arg Phe Leu Gly Tyr Lys Leu Lys Tyr Val
 50 55 60

Arg Asn Ile Thr Asp Ile Asp Asp Lys Ile Ile Lys Arg Ala Asn Glu
 65 70 75 80

Asn Gly Glu Ser Phe Val Ala Met Val Asp Arg Met Ile Ala Glu Met
 85 90 95

His Lys Asp Phe Asp Ala Leu Asn Ile Leu Arg Pro Asp Met Glu Pro
 100 105 110

Arg Ala Thr His His Ile Ala Glu Ile Ile Glu Leu Thr Glu Gln Leu
 115 120 125

Ile Ala Lys Gly His Ala Tyr Val Ala Asp Asn Gly Asp Val Met Phe
 130 135 140

Asp Val Pro Thr Asp Pro Thr Tyr Gly Val Leu Ser Arg Gln Asp Leu
 145 150 155 160

Asp Gln Leu Gln Ala Gly Ala Arg Val Asp Val Val Asp Asp Lys Arg
 165 170 175
 Asn Pro Met Asp Phe Val Leu Trp Lys Met Ser Lys Glu Gly Glu Pro
 180 185 190
 Ser Trp Pro Ser Pro Trp Gly Ala Gly Arg Pro Gly Trp His Ile Glu
 195 200 205
 Cys Ser Ala Met Asn Cys Lys Gln Leu Gly Asn His Phe Asp Ile His
 210 215 220
 Gly Gly Gly Ser Asp Leu Met Phe Pro His His Glu Asn Glu Ile Ala
 225 230 235 240
 Gln Ser Thr Cys Ala His Asp Gly Gln Tyr Val Asn Tyr Trp Met His
 245 250 255
 Ser Gly Met Val Met Val Asp Arg Glu Lys Met Ser Lys Ser Leu Gly
 260 265 270
 Asn Phe Phe Thr Val Arg Asp Val Leu Lys Tyr Tyr Asp Ala Glu Thr
 275 280 285
 Val Arg Tyr Phe Leu Met Ser Gly His Tyr Arg Ser Gln Leu Asn Tyr
 290 295 300
 Ser Glu Glu Asn Leu Lys Gln Ala Arg Ala Val Glu Arg Leu Tyr
 305 310 315 320
 Thr Ala Leu Arg Gly Thr Asp Lys Thr Val Ala Pro Ala Gly Gly Glu
 325 330 335
 Ala Phe Glu Ala Arg Phe Ile Glu Ala Met Asp Asp Asp Phe Asn Thr
 340 345 350
 Pro Glu Ala Tyr Ser Val Leu Phe Asp Met Ala Arg Glu Val Asn Arg
 355 360 365
 Leu Lys Ala Glu Asp Met Ala Ala Ala Asn Ala Met Ala Ser His Leu
 370 375 380
 Arg Lys Leu Ser Ala Val Leu Gly Leu Leu Glu Gln Glu Pro Glu Ala
 385 390 395 400
 Phe Leu Gln Ser Gly Ala Gln Ala Asp Asp Ser Glu Val Ala Glu Ile
 405 410 415
 Glu Ala Leu Ile Gln Gln Arg Leu Asp Ala Arg Lys Ala Lys Asp Trp
 420 425 430
 Ala Ala Ala Asp Ala Ala Arg Asp Arg Leu Asn Glu Met Gly Ile Val
 435 440 445
 Leu Glu Asp Gly Pro Gln Gly Thr Thr Trp Arg Arg Lys
 450 455 460

<210> 28
 <211> 377

<212> PRT

<213> Synechocystis sp.

<400> 28

Met Lys Asn Cys Glu Asn Asp His Arg Phe Thr Thr Val Ser Ser Gly
1 5 10 15

Lys Ala Trp Gly Gln Leu His Arg Phe Pro Ser Leu Ile Lys Phe Asn
20 25 30

Phe Ala His Arg Ser Thr Thr Ala Met Asp Lys Pro Arg Ile Leu Ser
35 40 45

Gly Val Gln Pro Thr Gly Asn Leu His Leu Gly Asn Tyr Leu Gly Ala
50 55 60

Ile Arg Ser Trp Val Glu Gln Gln Gln His Tyr Asp Asn Phe Phe Cys
65 70 75 80

Val Val Asp Leu His Ala Ile Thr Val Pro His Asn Pro Gln Thr Leu
85 90 95

Ala Gln Asp Thr Leu Thr Ile Ala Ala Leu Tyr Leu Ala Cys Gly Ile
100 105 110

Asp Leu Gln Tyr Ser Thr Ile Phe Val Gln Ser His Val Ala Ala His
115 120 125

Ser Glu Leu Ala Trp Leu Leu Asn Cys Val Thr Pro Leu Asn Trp Leu
130 135 140

Glu Arg Met Ile Gln Phe Lys Glu Lys Ala Val Lys Gln Gly Glu Asn
145 150 155 160

Val Ser Val Gly Leu Leu Asp Tyr Pro Val Leu Met Ala Ala Asp Ile
165 170 175

Leu Leu Tyr Asp Ala Asp Lys Val Pro Val Gly Glu Asp Gln Lys Gln
180 185 190

His Leu Glu Leu Thr Arg Asp Ile Val Ile Arg Ile Asn Asp Lys Phe
195 200 205

Gly Arg Glu Asp Ala Pro Val Leu Lys Leu Pro Glu Pro Leu Ile Arg
210 215 220

Lys Glu Gly Ala Arg Val Met Ser Leu Ala Asp Gly Thr Lys Lys Met
225 230 235 240

Ser Lys Ser Asp Glu Ser Glu Leu Ser Arg Ile Asn Leu Leu Asp Pro
245 250 255

Pro Glu Met Ile Lys Lys Lys Val Lys Lys Cys Lys Thr Asp Pro Gln
260 265 270

Arg Gly Leu Trp Phe Asp Asp Pro Glu Arg Pro Glu Cys His Asn Leu
275 280 285

Leu Thr Leu Tyr Thr Leu Leu Ser Asn Gln Thr Lys Glu Ala Val Ala
290 295 300

Gln Glu Cys Ala Glu Met Gly Trp Gly Gln Phe Lys Pro Leu Leu Thr
305 310 315 320

Glu Thr Ala Ile Ala Ala Leu Glu Pro Ile Gln Ala Lys Tyr Ala Glu
325 330 335

Ile Leu Ala Asp Arg Gly Glu Leu Asp Arg Ile Ile Gln Ala Gly Asn
340 345 350

Ala Lys Ala Ser Gln Thr Ala Gln Gln Thr Leu Ala Arg Val Arg Asp
355 360 365

Ala Leu Gly Phe Leu Ala Pro Pro Tyr
370 375

<210> 29

<211> 419

<212> PRT

<213> Bacillus caldotenax

<400> 29

Met Asp Leu Leu Ala Glu Leu Gln Trp Arg Gly Leu Val Asn Gln Thr
1 5 10 15

Thr Asp Glu Asp Gly Leu Arg Lys Leu Leu Asn Glu Glu Arg Val Thr
20 25 30

Leu Tyr Cys Gly Phe Asp Pro Thr Ala Asp Ser Leu His Ile Gly Asn
35 40 45

Leu Ala Ala Ile Leu Thr Leu Arg Arg Phe Gln Gln Ala Gly His Arg
50 55 60

Pro Ile Ala Leu Val Gly Gly Ala Thr Gly Leu Ile Gly Asp Pro Ser
65 70 75 80

Gly Lys Lys Ser Glu Arg Thr Leu Asn Ala Lys Glu Thr Val Glu Ala
85 90 95

Trp Ser Ala Arg Ile Lys Glu Gln Leu Gly Arg Phe Leu Asp Phe Glu
100 105 110

Ala Asp Gly Asn Pro Ala Lys Ile Lys Asn Asn Tyr Asp Trp Ile Gly
115 120 125

Pro Leu Asp Val Ile Thr Phe Leu Arg Asp Val Gly Lys His Phe Ser
130 135 140

Val Asn Tyr Met Met Ala Lys Glu Ser Val Gln Ser Arg Ile Glu Thr
145 150 155 160

Gly Ile Ser Phe Thr Glu Phe Ser Tyr Met Met Leu Gln Ala Tyr Asp
165 170 175

Phe Leu Arg Leu Tyr Glu Thr Glu Gly Cys Arg Leu Gln Ile Gly Gly
180 185 190

Ser Asp Gln Trp Gly Asn Ile Thr Ala Gly Leu Glu Leu Ile Arg Lys
195 200 205

Thr Lys Gly Glu Ala Arg Ala Phe Gly Leu Thr Ile Pro Leu Val Thr
 210 215 220
 Lys Ala Asp Gly Thr Lys Phe Gly Lys Thr Glu Ser Gly Thr Ile Trp
 225 230 235 240
 Leu Asp Lys Glu Lys Thr Ser Pro Tyr Glu Phe Tyr Gln Phe Trp Ile
 245 250 255
 Asn Thr Asp Asp Arg Asp Val Ile Arg Tyr Leu Lys Tyr Phe Thr Phe
 260 265 270
 Leu Ser Lys Glu Glu Ile Glu Ala Leu Glu Gln Glu Leu Arg Glu Ala
 275 280 285
 Pro Glu Lys Arg Ala Ala Gln Lys Ala Leu Ala Glu Glu Val Thr Lys
 290 295 300
 Leu Val His Gly Glu Glu Ala Leu Arg Gln Ala Ile Arg Ile Ser Glu
 305 310 315 320
 Ala Leu Phe Ser Gly Asp Ile Ala Asn Leu Thr Ala Ala Glu Ile Glu
 325 330 335
 Gln Gly Phe Lys Asp Val Pro Ser Phe Val His Glu Gly Gly Asp Val
 340 345 350
 Pro Leu Val Glu Leu Leu Val Ser Ala Gly Ile Ser Pro Ser Lys Arg
 355 360 365
 Gln Ala Arg Glu Asp Ile Gln Asn Gly Ala Ile Tyr Val Asn Gly Glu
 370 375 380
 Arg Leu Gln Asp Val Gly Ala Ile Leu Thr Ala Glu His Arg Leu Glu
 385 390 395 400
 Gly Arg Phe Thr Val Ile Arg Arg Gly Lys Lys Lys Tyr Tyr Leu Ile
 405 410 415
 Arg Tyr Ala